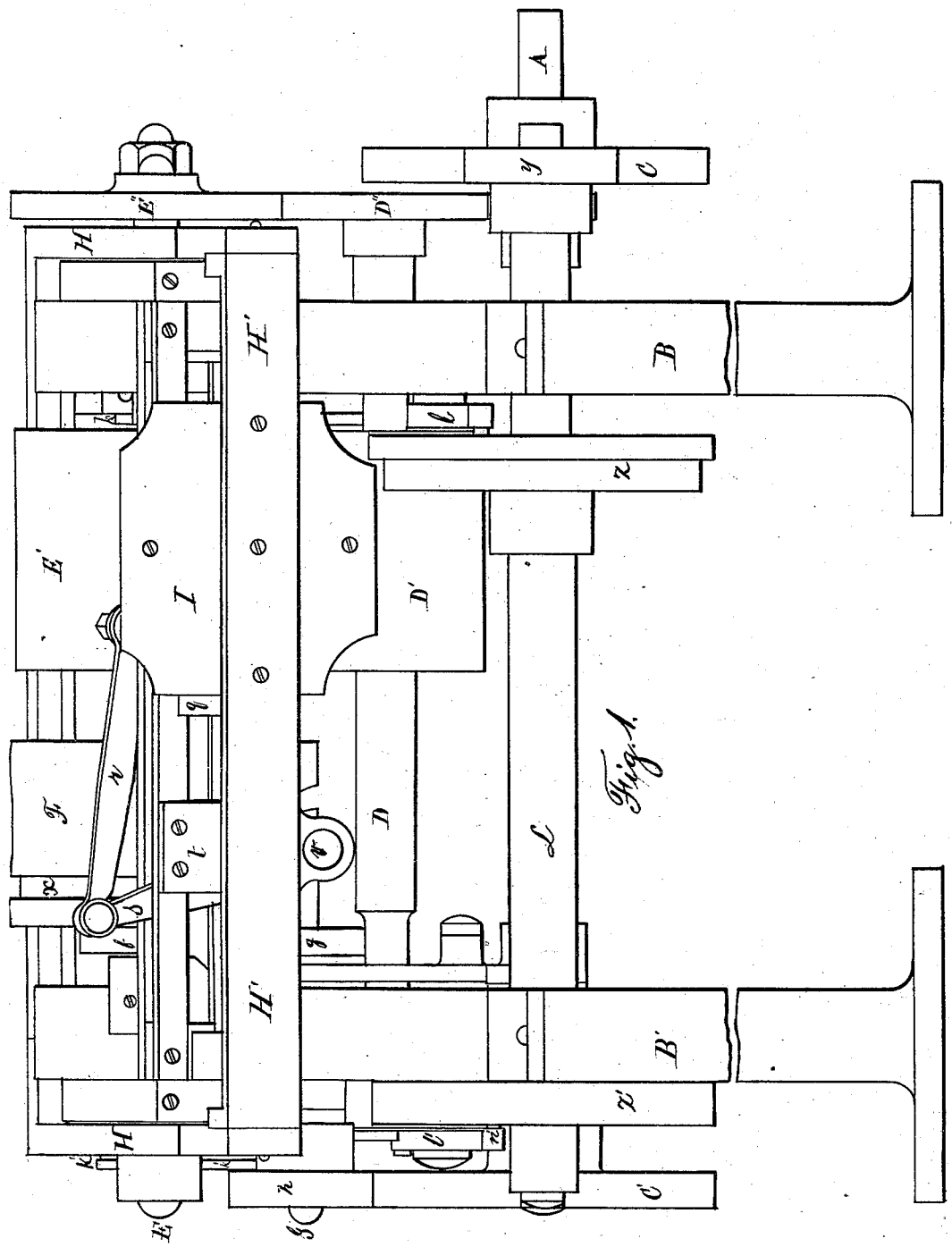
6 Sheets—Sheet 1.

F. BAYLIES.

Rubber-Cutting Machine.

No. 215,556. Patented May 20, 1879.



Witnesses
James M. Hicks
Henry Wm. Hicks

Inventor
Franklin Baylies
by his atty Wm C. Hicks

6 Sheets—Sheet 2.

F. BAYLIES.

Rubber-Cutting Machine.

No. 215,556. Patented May 20, 1879.

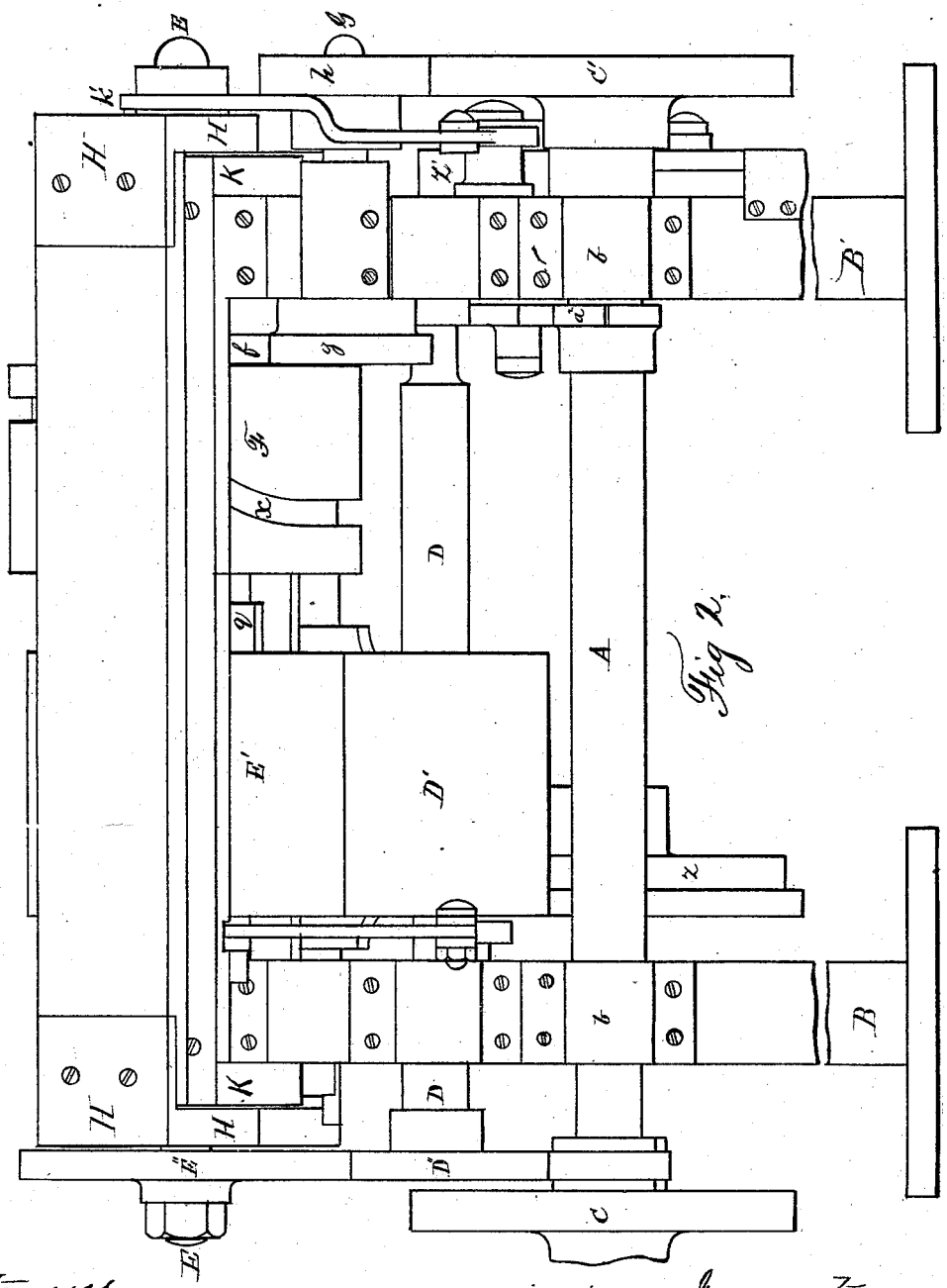


Fig 2.

Witnesses
James M. Hicks
Denny & Wright

Inventor
Franklin Baylies
by his atty. Wm. C. Hicks

F. BAYLIES.

Rubber-Cutting Machine.

No. 215,556. Patented May 20, 1879.

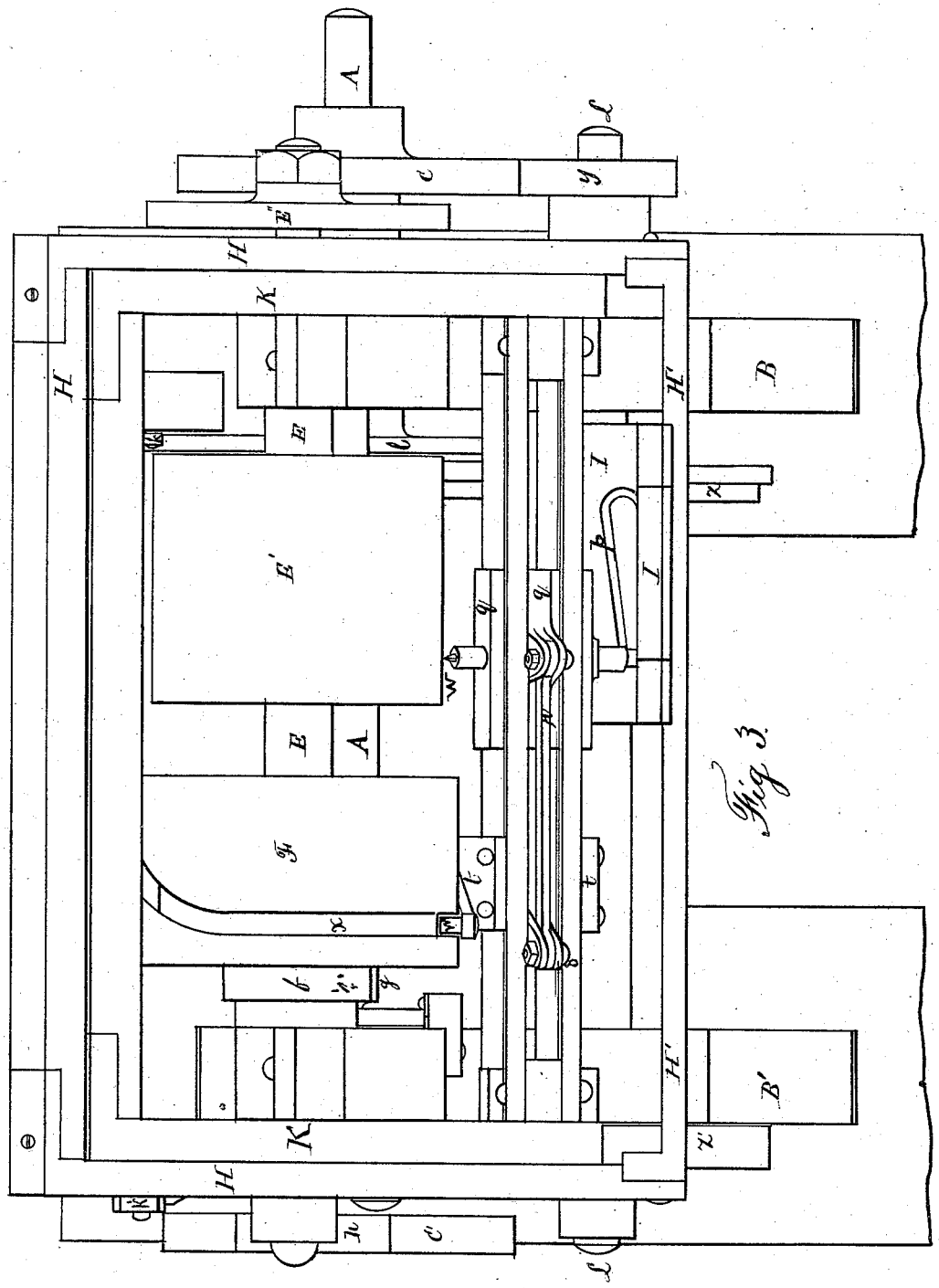


Fig. 3.

Witnesses
James M Hicks
Henry Wm

Inventor
Franklin Baylies
by his atty Wm C Hicks

6 Sheets—Sheet 4.

F. BAYLIES.

Rubber-Cutting Machine.

No. 215,556. Patented May 20, 1879.

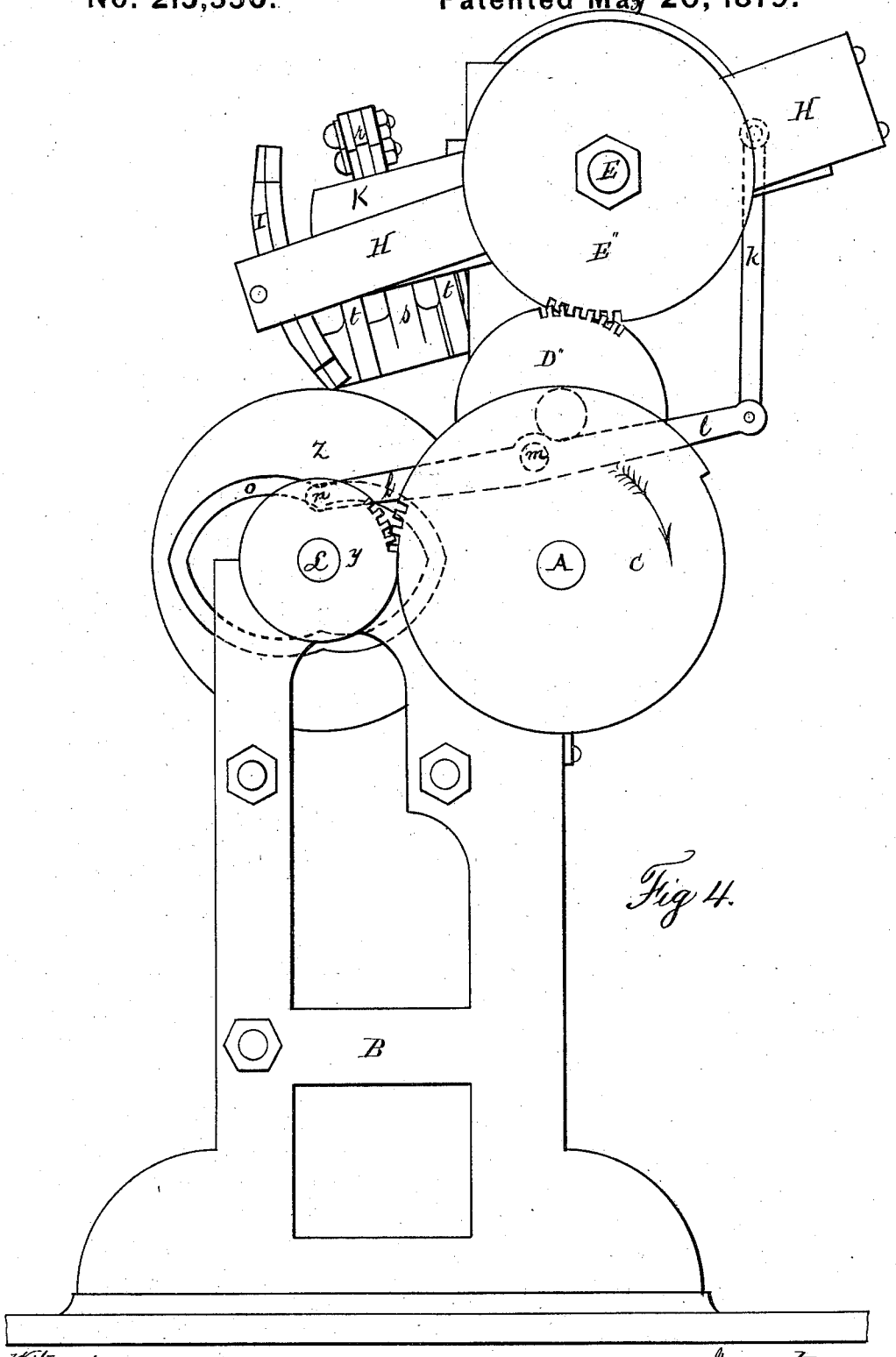


Fig 4.

Witnesses
James M. Hicks
Henry J. Wilson

Inventor
Franklin Baylies
by his atty Wm. L. Hicks

6 Sheets—Sheet 5.

F. BAYLIES.

Rubber-Cutting Machine.

No. 215,556. Patented May 20, 1879.

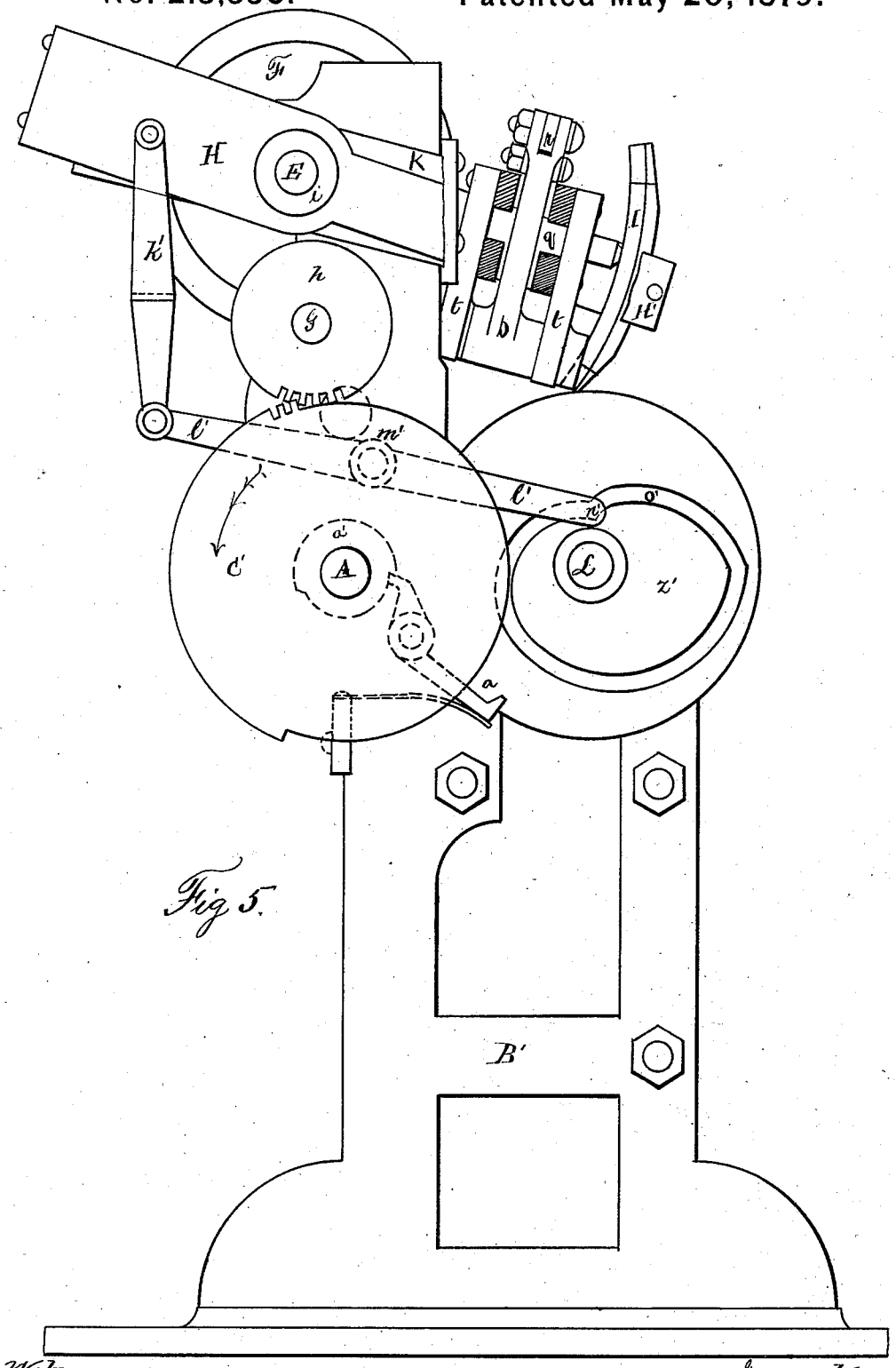


Fig 5.

Witnesses
James M. Hicks
Benj. J. Wilson

Inventor
Franklin Baylies
by his atty M. M. Hicks

F. BAYLIES.

Rubber-Cutting Machine.

No. 215,556. Patented May 20, 1879.

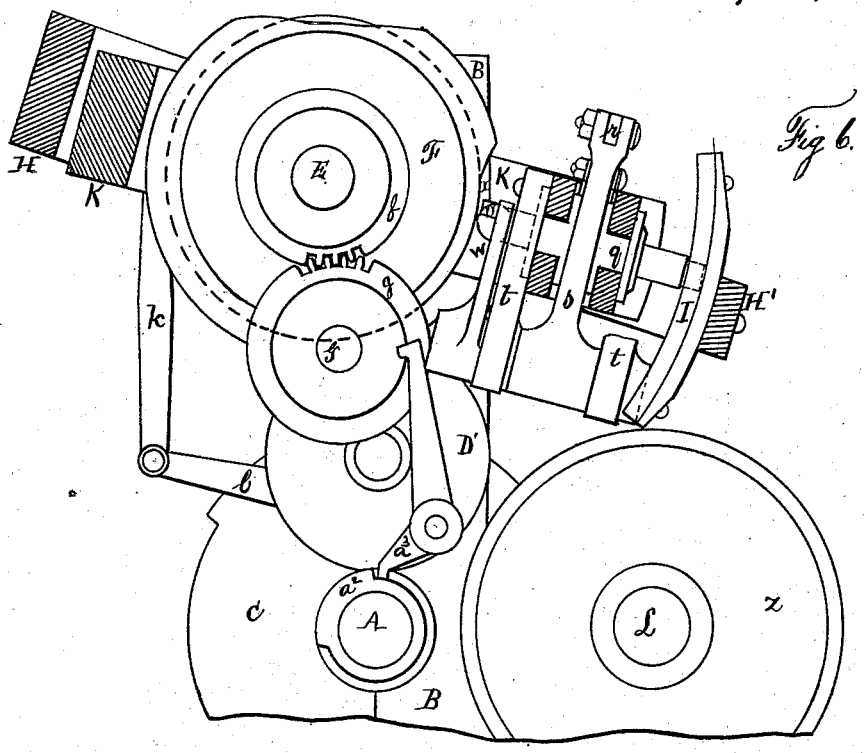


Fig 6.

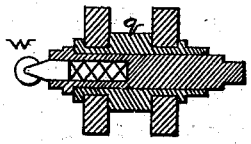


Fig 7.

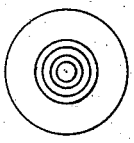


Fig 8.

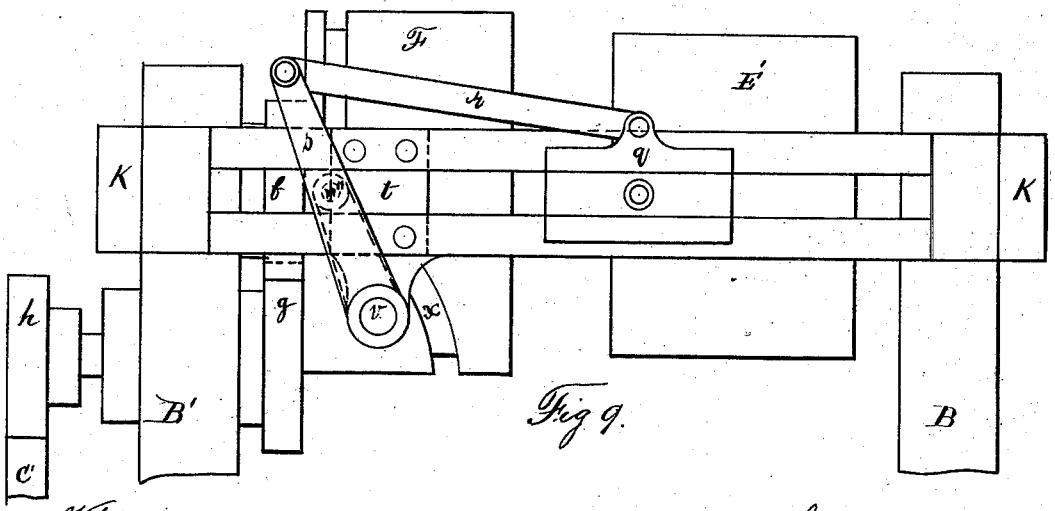


Fig 9.

Witnesses
James M Hicks

Inventor
Franklin Baylies
by his atty Wm C Hicks

UNITED STATES PATENT OFFICE.

FRANKLIN BAYLIES, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF, JARVIS MORGAN SLADE, AND CHARLES FORD, OF SAME PLACE.

IMPROVEMENT IN RUBBER-CUTTING MACHINES.

Specification forming part of Letters Patent No. **215,556**, dated May 20, 1879; application filed November 30, 1878.

To all whom it may concern:

Be it known that I, FRANKLIN BAYLIES, of the city, county, and State of New York, have invented a new combination of machinery for cutting out and shaping blanks for rubber shoes or other articles from a continuous web or sheet of material; and I hereby declare that the following is a full, clear, and exact description and specification of the same, reference being had to the annexed drawings, making a part thereof.

The object of my invention is to cut out shoe-blanks or such like articles from the web or sheet of the material from which they are to be formed while it is in motion, to save the cost of cutting them by hand after the web has been run out of the machine.

In a previous invention, a patent for which was granted me as joint inventor with Jarvis Morgan Slade and Charles Ford, dated May 28, 1878, and numbered 204,145, the blanks are cut into shapes by mechanism while the web or sheet is carried forward on a roll, the cutter being moved parallel with the axis of the roll-shaft which carries the web, the cutter being moved and turned to suit the angle to be cut by means of revolving cams.

In my present invention the cutter is moved by mechanism both parallel with the axis of the carrying and supporting roll, and also in the direction of the length of the sheet or web, either in the direction of the line of its movement or against the said line of movement, as the shape of the blank may require, while at the same time the cutter is turned to the proper angle to conform to the line of cut as the shape is being formed. Thus any shape of blank may be made by my machine, since the cutter may move forward faster than the sheet or slower than the sheet or web to shape the inner or outer lines of the blank, whatever that shape may be. I have therefore provided mechanism for cutting both the exterior lines and the interior lines of a rubber shoe-blank so perfectly that a shoe may be formed without any hand cutting after the blank has been discharged from the machine.

My invention consists in certain combinations of mechanism, which combinations are specifically set forth at the end of this schedule.

In order that persons skilled in the art may understand, make, and use my invention, I will proceed to describe the manner in which I have embodied it by reference to the drawings, in which—

Figure 1 is a front view of my machine. Fig. 2 is a rear view of the same. Fig. 3 is a top view of the same. Figs. 4 and 5 are end views, with a part in section. Fig. 6 is an end view of the parts as they would appear with one side of the frame removed, and also parts of the mechanism in section. Fig. 7 is a section of the cutter spindle and slide. Fig. 8 is an end view of the same. Fig. 9 is a front view of the cutter-slide and its connections, the cam for giving the horizontal motion to the cutter, slide, and levers, also the carrying and supporting roll E′.

The main or driving shaft A is mounted in bearings *b b* on the end frames B B′, and is to be continuously revolved in the direction of the arrows, Figs. 4 and 5. It is provided with two disks, C C′, one keyed on each end, overhanging the bearings *b b*. Gear-teeth are raised on each disk, extending over a little more than one-third, more or less, of their whole circumference. On one end of the said main shaft, and between the gear-disk C and the end frame, B, is another gear, keyed firmly to the shaft A, which communicates motion continuously to gear D″, keyed to a shaft, D, above and parallel with shaft A, also having bearings in the end frames B B′. The shaft D is provided with a roll, D′, keyed to it near the end frame B, and between the latter and B′. The roll D′ is either a calender-roll or a printing-roll, as may be desired, and carries above its upper surface the web or sheet to be acted on by the cutter. The gear D″ communicates continuous motion to gear E″, keyed on the end of a shaft, E, above and parallel with shaft A, and also hung in bearings on the end frames B B′.

On the shaft E, between the end frames B B′, is a roll, E′, directly over the roll D′ on shaft D. The roll E′ is that over which the web or sheet is carried, against which the cutter acts, and on which the shape is formed as the web is moved forward continuously on its circumferential surface. On this same shaft

E, and near the end frame B′, is a cam-roll, F, not keyed to the shaft, but arranged to revolve on it at times, and at times to remain at rest, while the shaft continues to revolve.

When the cam-roll F is revolved it is done by means of a gear, *f*, attached to it between it and the end frame B′, the gear *f* being actuated periodically by a gear, *g*, on the short shaft G, having a bearing on end frame B′ under shaft E, which short shaft G is, in turn, operated by a gear, *h*, on its outer end meshing into the teeth of the disk C′, when they engage with gear *h* during part of the revolution of the disk C′.

Thus it will be noticed that the cam-roll F revolves on the shaft E as a center or bearing; but its motion depends on the disk C′, and not on the motion of E. Shaft E carries a rectangular frame, H, mounted in bearings *i i* on its two outer ends, beyond the end frames B B′. The said frame H, hung on the shaft E as a center, lies substantially in a horizontal direction, and receives a vibration around the shaft E at the proper times by means of a connecting-link, *k′*, a lever, *l′*, pivoted to the frame B′ at *m′*, and a pin, *n′*, running in a cam-groove, *o′*, to be described hereinafter.

The frame H is provided with a concave plate, I, attached to the inside of its front bar, H′, and in the face of said plate is cut a groove, *p*, of the proper shape to turn and present the cutter to the web and roll E′ at the proper angle—that is, at the angle of the lines of the blank at all parts of its configuration, the latter depending on the shape of the cams and the motion of the web, and not on the shape of the groove in the concave plate I. When the concave plate I is moved upward by means of the cam-groove *o′* and lever *l′*, its motion is the same as it would be if it were keyed to the shaft E during that period of time, so that the rear end of the cutter-spindle, which moves in the groove *p*, and the cutter on the surface of the roll E, move in the same manner as they would if the surface of the roll and concave plate were without motion, the other cams giving the cutter the required cutting motions. On the shaft E is also another horizontal rectangular frame, K, mounted on bearings on the shaft E, in the same manner as the frame H outside of the end frames B B′. This frame K is smaller than frame H, and vibrates within the inclosure of the other by means of a connecting-link, *k*, a lever, *l*, pivoted to the end frame B at *m*, and a pin, *n*, running in a cam-groove, *o*, to be described hereinafter.

The frame K receives all its motion from the groove *o*, and that motion is around the shaft E as a center. It carries the cutter up and down on the surface of E′, sometimes faster than the speed of the surface E′, and in the same direction as said surface, at times in a direction opposite to the motion of the surface of E′, and at other times having no movement, when the cutter is permitted to cut the web in lines parallel with the line of the motion of the surface of E′ by the forward movement of E′ alone.

The front side of the frame K, near the concave plate I, is provided with guiding-ways, to sustain and guide in a direction parallel with the axis of E′ the cutter-slide *q*. To the cutter-slide *q* is pivoted a link, *r*, and said link is attached by a similar joint to the upper end of a vibrating lever, *s*, on a shaft, *v*, having bearings in a plate, *t*, fixed to the said guiding-ways, on which shaft the lever vibrates. The lever *s* is moved, and the cutter-slide with it, by means of another short lever attached to the short shaft *v*, carrying a pin, *n″*, running in the groove *x* in the surface of the cam F. The cam F gives motion to the levers and slide *q* and the cutter in a direction parallel with the axis of the shaft E, and said cam gives no other motion.

Parallel with shaft A, in the same horizontal plane, is a shaft, L, having bearings in the end frames B B′, and extending beyond the end frames on each end. On one end is keyed a gear, *y*, which at times meshes into the teeth on the disk C, at which times the disk gives the gear *y* and shaft L exactly one revolution. On the other end of shaft L, outside of the end frame B′, is attached a cam-disk, *z′*, in the outer face of which is a groove, *o′*, before referred to. This cam is so shaped that when the shaft makes one revolution the rectangular frame H makes one vibration up and down, the concave plate moving up with the frame at the same speed that it would if it were attached to the shaft E′, and down again at the same time, and with about the same proportionate speed, as the concave frame I.

There is a notch in the circumference of the disk *z′*, into which a lever-catch, *a*, enters under the force of a spring, and holds the disk in a fixed position until the said catch is raised by means of a cam, a^1, on shaft A, located just outside of end frame B′, between the latter and disk C′, the catch being pivoted to B′, and being provided with a lever, the end of which is raised by the cam a^1, to hold the catch out of its notch when the shaft L is in motion. On the shaft L, between the end frames B B′, is another cam-disk, *z*, in the face of which is the cam-groove *o*, before referred to. This groove is shaped to move the frame K up and down, by means of the levers before described, while the shaft L is making one revolution.

On shaft A is another face-cam, a^2, inside the frame B′, and another lever-catch, a^3, pivoted to frame B′, to prevent cam F from moving. The end of this catch enters a notch in the hub of the gear on the short shaft G. When the gears and cam F are to be put in motion by the teeth on disk C′, the cam a^2 raises the catch and holds it away until cam F has made one revolution.

Operation: The shaft A having been put in motion by power, the rolls D′ and E′ are caused to revolve continuously together, the roll E′ turning in the same direction as the shaft A. The web or sheet is carried between the top of

D′ and the bottom of E′, and over the top of E′, covering its surface, the cutter W being at the extreme end of its vibration toward the frame B′, and, standing vertically, the sheet is cut in a line parallel with the line of motion of the sheet or web. When the teeth on the disk C engage with the teeth of the gear on the end of shaft L, and the teeth on disk C′ engage with the teeth of the gear *g* on the short shaft G, (the catches having been raised to permit motion of the gears,) the frames H and K and the cutter W being at their lowest position, the cams F and *z* and *z′* begin to revolve, and the cutter *w* begins to be moved by the combined action of F and *z* over the surface of E′, and cuts the web of rubber or other material in a shape corresponding with their combined motions, (in this case the inner lines of a rubber shoe-blank,) while the cam *z*, through the frame H and the levers, causes the concave plate I to follow the motion of E′, the groove *p* in the concave plate turning the cutter to the proper angle to make a clean cut in the rubber. A shoe is fitted in said groove *p*, attached to the end of the cutter-spindle, which, following the said groove, turns the cutter-spindle and cutter according to the requirements.

The cutter *w* is connected to the cutter-spindle, and may or may not revolve on its axis; but I prefer to make the cutter, however, revolve, with a spring to press the shank on which it is pivoted toward the web and surface of E′, as is represented in Figs. 7 and 8, and substantially as is shown and described in the patent issued to myself, Slade, and Ford, above referred to. While the cutter is being carried across the sheet it may advance in the line of the direction of the movement of the sheet faster than said movement, and be made to shape curves and reverse curves in the web, as desired, the cam F and *z* and the groove in the concave plate being shaped accordingly.

It is particularly to be noticed that the cam F gives the cutter its entire motion parallel with the axis of E′, and the cam *z* the entire motion in lines parallel with the movement of E′ on its axis, the cam-groove in the concave plate I serving only to turn the cutter to the proper cutting angle, and this it is enabled to accomplish by following the movement of the surface of E′ during its upward stroke. Straight lines, parallel with the movement of the web, may be made by stopping the action of the cam F on the cutter-slide, and holding the cutter in a vertical position in the groove of the concave plate I.

I propose to combine in one machine cutters to shape the blank, both on outside and on inside lines, by the addition of more cutters and cams to do the required work.

It is obvious that a great variety of changes may be made without affecting the substance of my invention.

Having now fully described my invention and my way of constructing it, what I claim, and desire to secure by Letters Patent, is—

1. The combination, substantially as hereinbefore set forth, of a supporting and carrying roll or other surface for supporting and carrying forward the web or sheet to be cut, and the cams and connections adapted to move the cutter in the direction of the movement of the web to be cut, and also at right angles to that direction, substantially as before described.

2. The combination, substantially as hereinbefore set forth, of the supporting and carrying roll with the cutter-slide cams and connections adapted to move the cutter over the surface of said rolls, both parallel with its axis and at right angles thereto, for the purpose of cutting any desired shape in the sheet or web of material while under motion.

3. The combination, substantially as hereinbefore set forth, of the supporting and carrying roll, the cutter spindle and slide, and one or more cams, with suitable connections, and the swinging frame, provided with a guiding-plate for turning the cutter to the angle of the shape to be cut, substantially as set forth.

4. The combination, substantially as hereinbefore set forth, of the supporting-roll, the swinging frame provided with a guiding-plate, the swinging frame provided with the cutter-slideways and cutter-slide, and the cams and connections, arranged to operate substantially in the manner and for the purposes set forth.

FRANKLIN BAYLIES.

Witnesses:
WM. C. HICKS,
JAMES M. HICKS.